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EXAMINER

DINH, TIEN QUANG

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/053,666  
Filing Date: January 24, 2002  
Appellant(s): BILLINGER ET AL.

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Ms. Suzin C. Bailey  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 4/7/10 appealing from the Office action mailed 5/7/09.

**(1) Real Party in Interest**

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The following is a list of claims that are rejected and pending in the application:

Claims 24, 25, and 28 are withdrawn.

Claims 15, 19-23, 26, 27, 30, and 32-36 are rejected.

**(4) Status of Amendments After Final**

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN

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REJECTIONS.” New grounds of rejection (if any) are provided under the subheading “NEW GROUNDS OF REJECTION.”

### **(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant’s brief.

### **(8) Evidence Relied Upon**

6234423	Hirahara et al	5-2001
5224670	Padden	7-1993

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

**I.** Claims 15, 19, 21-23, 26, 27, 30 and 32-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirahara et al (6,234,423) and in view of Padden 5224670.

Hirahara discloses a fitting (13 made up of parts 13a,b), Moveable Part 11, 14, 15 in combination and illustrated in Figure 10 #13a&b connect #11/14/15 to the tail of the aircraft (see Figure 3); both skins 11, 12 and the spar 13 are bonded by a pasty thermosetting adhesive to together form a single structure the box-structure airfoil 10 comprises a composite material upper skin 11 forming a top surface of the airfoil, a composite material lower skin 12 forming a bottom surface of the airfoil, and a composite material spar 13 (see Col. 4, lines 50-60) made from CFRP (Carbon Fiber Reinforced Polymer, see Col. 5, lines 33-41). The movable part (#11-15) is an elevator (see figure 3). The fact that Hirahara et al do not employ a resin transfer molding method is of no consequence since this limitation is a product by process limitation. The patentability of a product does not depend on its method of production. If the product in the

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product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even through the prior product was made by a different process. The movable part (#11-15) is control surface (see Figure 3). Both skins 11, 12 and the spar 13 are bonded by a pasty thermosetting adhesive to together form a single structure. (Integral) Plus to make things integral is a routine step one skilled in the art would have used to make a stronger structure.

The box-structure airfoil 10 comprises a composite material upper skin 11 forming a top surface of the airfoil, a composite material lower skin 12 forming a bottom surface of the airfoil, and a composite material spar 13 (see Col. 4, lines 50-67) made from CFRP (Carbon Fiber Reinforced Polymer, see Col. 5, lines 33-41). The material used to make the airfoil 10 has reactive material since it is CFRP.

The fitting is imbedded in the recess as shown in figures 1 and 2. The upper covering layer and lower covering layer is 11, 12 respectively. The fitting is inbetween them. See figures 1 and 2. The indentation in the moveable part is readily seen in figure 2.

Re claim 30, since the fitting and movable parts are made out of the same material, CFRP, the thermal expansion coefficient is the same.

Hirahara does not disclose bearing.

A **bearing** is a device to permit constrained relative motion between two parts, typically rotation or linear movement

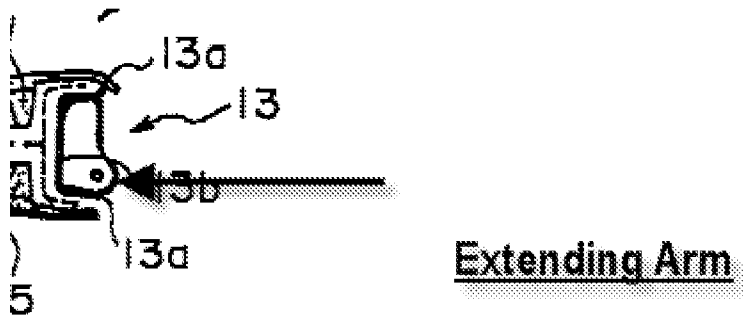
The examiner takes OFFICIAL NOTICE that bearings are notoriously well known means to permit constrained relative motion between a structural and a movable part (see for examle [www.wikipedia.org](http://www.wikipedia.org)).

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It would have been obvious to one having ordinary skill in the art, at the time the invention was made to use a bearing to permit constrained relative motion between the elevator and the tail. Applicant has not challenged that bearings are well known and is now admitted prior art.

If applicant is not saying bearings and bearing surfaces are not well known and challenges the official notice, this seems too late. The examiner would also like to point out that Padden clearly shows bearing surfaces in figures 1, 2, 4, and 7 that receive inherently bearings. Hence, it would have been obvious to a person skilled in the art at the time the invention was made to have used bearings and bearing surfaces in Hirahara's system as taught by Padden to allow the control surfaces to pivot with respect to the aircraft.

The examiner maintains that the budged-out portion (where number 13b is pointed to in figure 1) is an arm extended outwardly in a direction away from the movable part mounting structure. Plus, the integral fitting 13 has a movable part mounting structure which can be the part 13a. The structural component connecting part so as to connect the movable part with the structural component is part 13b (which is where the arm is). Although Hirahara et al doesn't have a number to shown the aperture on the arm, it is clearly shown in figure 1 that the aperture is where the movable part 11, 14, 15 is connected to the structural component (or wing) of the aircraft. The aperture defines a bearing surface having bearings. Since the movable surface 11, 14, 15 is pivotable, the bearing is located in the aperture so that the movable surface can pivot with respect to the structural component. Hirahara et al teaches the use of glue to secure the movable parting mounting structure to the movable part. See column 5, lines 23-32.



RE claims 35 and 36, the second arm is clearly shown in figure 2. The fitting 13 has many arms. The articulation points are where the bearings are fitted inside the apertures. Since the apertures are parallel to each other, the articulation points are parallel to the other articulation points. Padden also shows multiple arms in figures 1-2, 4-7. It would have been obvious to one skilled in the art at the time the invention was made to have used multiple arms that are parallel to other another to allow the control surfaces to pivot with respect to the aircraft more efficiently.

Although, the examiner feels that Hirahara et al teaches what has been claimed, the examiner also rejects the claims in view of Padden. Padden clearly teaches fittings 4, 5, 6, that have arms (first, second, third, etc) with apertures 11-14 are well known. Arms are also shown in figure 2 with apertures. A person skilled in the art would have used integral fittings with arms in Hirahara et al as taught by Padden to allow better control of the movable part.

2. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirahara as modified by Padden 5224670 in view of Koppelman et al (3,102,559). Hirahara does not

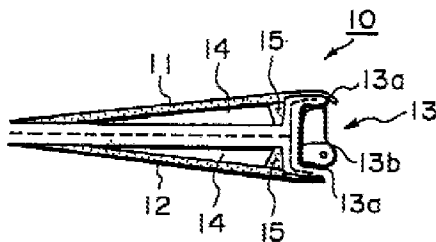
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disclose using nylon as a reactive material. Koppelman discloses a composite material formed by impregnating woven structure made of nylon fibers with a thermosetting resin (see col. 14, line 22). It would have been obvious to use nylon as the reactive material since nylon allows for improved tensile strengths with relatively high compression strength. Furthermore, it has been held that to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious.)

#### **(10) Response to Argument**

The examiner respectfully disagrees with appellant's argument that Hirahara in view of Padden does not teach each and every element of the claimed invention. As pointed out by the examiner in the final rejection, Hirahara in view of Padden does indeed teach all claimed parts. Although the examiner strongly believes that Hirahara teaches a fitting with extending arms with apertures defining bearing surfaces (as best seen in figure 1),

**FIG. 1**



Padden was used to definitively show that bearing surfaces are well known to receive bearings. See Padden's figures 1, 2, 4, and 7.



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Appellant also argued that Hihara does not show the use of composite material for the fitting. The examiner disagrees since it is clear that the fitting 13 (which acts as a hinge in order for the flap 10 to pivot with respect to the tail surface seen in figure 2) is made out of composite such as CFRP, the same as the parts 11, 12. See column 4, lines 51-6 and column 5, lines 33-36.

The spar 13 is made up of flanges 13a located on both sides and a web 13b which together form a U-shaped cross section as shown in FIGS. 1 and 2. The flanges 13a on both sides are bonded to the individual skins 11, 12 by the adhesive. The web 13b is bonded to the elongate projections 15 of both skins 11, 12 by the adhesive. With this adhesive bond construction, an adhesive strength equivalent to the adhesive strength achieved by a spar having an I-shaped cross section is obtained by using the spar 13 of the U-shaped cross section.

The spar 13 is produced by laminating composite prepreg like thermosetting CFRP, for instance, shaping the composite prepreg laminate into a U-shaped cross section, and then hardening it by heat.

Next, an airfoil forming method according to the present embodiment is described.

Appellant seemed to believe that fittings 13 are part of the control surface 10 but do not act as a hinge. This is not persuasive to one of ordinary skill in the art since 10 is an elevator of an aircraft. This elevator 10 is moved up and down with respect to the tail wing so as to control the airflow around its surface in order to produce pitch. Since part 10 must pivot up or down to function, fitting 13 must act as a hinge to permit the elevator 10 to move as desired.

As for the Declaration of Helmut Kaufmann, Mr. Kaufmann's incorrect interpretation that "Hirahara does not address the hinges at all, but only methods of forming the box structure of the movable surface" is noted but is respectfully disagreed by the examiner. It is clear that the fitting (hinge 13), which is part of the control airfoil 10, is used to attach to the control airfoil to the tail wing to permit the airfoil 10 to pivot up or down. It is quite irrational to conclude that fitting 13 is not a hinge since this would mean that the control airfoil is stationary and not permitted to

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move up or down. Lastly, Mr. Kaufmann wrongly concluded that fittings of Hirahara are anything other than conventional metal connectors instead of composite connectors. Where is the proof that Hirahara's fittings are metal? Where is it specifically stated that the fittings 13 are made out of metal when it is clearly stated that the fittings are CFRP? Flanges 13a and fittings 13b are explicitly disclosed as part of spar 13, and spar 13 is explicitly taught as made of CFRP

The spar 13 is made up of flanges 13a located on both sides and a web 13b which together form a U-shaped cross section as shown in FIGS. 1 and 2. The flanges 13a on both sides are bonded to the individual skins 11, 12 by the adhesive. The web 13b is bonded to the elongate projections 15 of both skins 11, 12 by the adhesive. With this adhesive bond construction, an adhesive strength equivalent to the adhesive strength achieved by a spar having an I-shaped cross section is obtained by using the spar 13 of the U-shaped cross section.

The spar 13 is produced by laminating composite prepreg like thermosetting CFRP, for instance, shaping the composite prepreg laminate into a U-shaped cross section, and then hardening it by heat.

Next, an airfoil forming method according to the present embodiment is described.

as earlier noted

It seems obvious

that Mr. Kaufmann concluded erroneously and has not provided any evidence to back up his assertions.

As for the Padden reference, the examiner has stated in the final office action and will repeat the statement that Padden was used to definitely show that extending arms with bearing surfaces are well known, rather than rely only on Official Notice. The fittings and extending arms of Padden (as shown in figure 1) are very similar to Hirahara's fitting with extending arms. Padden is **not** used to teach about the material makeup of the fitting since Hirahara already shows that his fitting is made from composite materials.

As for the Billinger Declaration, Billinger's conclusion that "it is conventional to make aircraft spoiler hinges of metal, and to use metal fasteners to connect the metal fittings securely

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to the movable parts” is noted, and examiner even agrees that it is conventional and more common, but this can not overcome the fact that Hirahara's invention uses fittings made out of composite materials. The mere fact that Mssrs. Kaufmann and Gradiner were ”surprised” that fittings can be made out of composite material does not negate the fact that Hirahara teaches what has been claimed.

As for the argument concerning neither Hirahara nor Padden discloses the use of glue to secure elements together, Hirahra clearly teaches that in column 4, lines 51-59 that glue are used. The terms used were "adhesive bonding". Plus, in column 5, line 4, "glue film 19" is used to assemble the parts together.

Applicant also argued about the RTM method step. What applicant has claimed is a product by process. The product of Hirahara teaches what has been claimed and could be made by the RTM method. See *In re Marosi*, 710 F. 2d 799, 218 USPQ 289 and *in re Thorpe*, 777 F. 2d 695, 227 USPQ 964. Also see MPEP 2113.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner’s answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Tien Dinh/

Primary Examiner, Art Unit 3644

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Conferees:

/Mike Mansen/

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